

## RESEARCH PAPER

### **Hamlet without the prince: the capital approach to development, the New Zealand Treasury's *Living Standards Framework* and policy making**

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*Many governments are going 'beyond GDP' to measure standards of living and to base policy on such wider considerations. One of the more advanced approaches is the Living Standards Framework used by the New Zealand Treasury as a complementary input into the policy process. This paper uses the Framework as a case study to highlight shortcomings and unresolved theoretical and empirical issues in the underlying theoretical model (i.e., the capital approach to development based on mainstream neoclassical economics). In particular, innovation is noticeable mostly by its absence, despite being the main driver of living standards in the long-run. It is argued that innovation should be at the centre of the Framework. Moreover, one must go beyond standard welfare analysis and use a model of the innovation–subjective wellbeing nexus in order to assess the many, potentially very complex, wellbeing implications of innovation. Adoption of such a perspective, although currently resisted by many policy makers, seems to fit well with the 'normative turn' in innovation economics. It does not make one a neo-Luddite. Instead, adoption might help overcome resistance to innovation. This should be especially important at a time when the spread of digital technologies is forecast to cause major societal disruptions.*

## **Introduction**

The New Zealand Treasury has developed and adopted a *Living Standards Framework* (henceforth the *Framework*) to be used as a complementary input into the policy process. This is in response to criticism of being too focussed on income (i.e., GDP) as the overriding policy goal. It is also a response to developments in economics and other social sciences, as well as in policy thinking by other New Zealand government agencies, overseas treasuries and organisations, such as the OECD. In short, the *Framework* is part of wider developments that reassess how to judge 'economic growth', 'progress' and 'wellbeing', and what impact this might have on policy making (Stiglitz *et al.*, 2009). The *Framework*, outlined in Gleisner *et al.* (2011, 2012), is meant to help the Treasury to:

... consistently provide Ministers robust, theoretically-grounded and evidence-based advice that aims to improve the lives of all New Zealanders ... The *Framework* is underpinned by a range of theoretical approaches, including welfare-based economic theories, capability approaches, sustainable development and subjective wellbeing. (Gleisner *et al.*, 2011, p.1)

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Treasury (2012) and related background notes, as well as earlier related work by other agencies (Statistics New Zealand, 2008), make it clear that the sustainable development model underlying the *Framework* is firmly based on the capital approach to development, an approach promoted by the World Bank and the joint UNECE/Eurostat/OECD Task Force for Measuring Sustainable Development (TFSD) (World Bank, 2006, 2011; UNECE, 2013). This is explicitly acknowledged in the 2013 *How's Life* report published by the OECD (OECD, 2013, p.178). Treasury (2013b, p.1) states:

The sustainable development model seeks to integrate the four capitals – natural, economic (physical and financial), human and social by understanding the interrelationships and dependencies between them. The policy challenge is maintaining viable levels of all the capitals in a world looking for higher living standards.

Adoption by the Treasury of such a wider perspective should be welcomed. However, there are major conceptual and measurement issues, currently unresolved, that reduce the usefulness of the capital approach. There seems to be little awareness of these. In particular, innovation is almost entirely absent. I argue that the *Framework* needs to put innovation and its wellbeing effects at its centre, the simple reason being that living standards and sustainable development are intrinsically linked to innovation. Without innovation, maintenance of (let alone increases in) living standards are unlikely.

Of course, many economists regularly comment on the pre-eminence of productivity growth for rising standards of living. Helpman (2004, p.33), for instance, states that ‘there is convincing evidence that total factor productivity (TFP) plays a major role in accounting for the observed cross-country variation in income per worker and patterns of economic growth’. A major driver of productivity differences is innovation, in combination with the quality of institutions that support it (i.e., the innovation system). The neglect of innovation in the *Framework* is somewhat surprising, given that in many other contexts, the New Zealand Treasury, as well as other government agencies, share the view that productivity is the driver of living standards (e.g., Kidd, 2008; Procter, 2011).

Innovation is characterised by Schumpeterian ‘creative destruction’, a term that immediately suggests positive as well as negative impacts of innovation. Capitalism involves constant change. It is ‘restless’ because knowledge is restless (Metcalf, 2001). Progress and equilibrium are incompatible. Such thinking seems absent from the *Framework*. Because the *Framework's* thinking is based on neoclassical economic theory, the real sources of ‘progress’ (i.e., what drives capitalism) are noticeable mostly by their absence. Therefore, the neglect of innovation in the *Framework* is, to some extent, understandable, given the underlying theoretical model, and also because mainstream and various alternative schools of economics, as well as (interdisciplinary) innovation studies, do not (yet) have a normative (i.e., welfare) theory of innovation. Such a theory should consider, as much as possible, the many different impacts of the process of creative destruction, a task that Schumpeter himself abandoned.<sup>1</sup> Researchers have begun to address the normative dimensions of the many different impacts of innovation. So far, arguably the only major attempt employing neoclassical economics is that of Baumol (2010).<sup>2</sup> Researchers who regard mainstream economics as too restrictive for this purpose and use broader approaches instead, include Swann (2009), Hawkins and Davis (2012), Dolan and

Metcalfé (2012), Schubert (2012a, 2012b, 2013), Binder (2013, 2014) and Martin (2013).

An additional important argument for putting innovation and innovation policy at the centre of the *Framework* is that technological developments, especially the spread of digital technologies, are having major negative impacts on people's employment opportunities and the distribution of income and wealth. While the digital 'second economy' (Arthur, 2011) and the 'second machine age' (Brynjolfsson and McAfee, 2014) promise greatly increased material living standards for everyone, this is likely to involve major economic and societal upheavals before they can be realised. Similarly, Perez (2013) argues that the current world economic and financial crisis is not unique, but rather the latest example of a crisis at the midpoint of the diffusion of a major new technology – information and communication technologies (ICTs). Since the beginning of the industrial revolution, there have been four similar crises, all followed by a new 'golden age' of prosperity. If history is any guide, return to an active state that implements policies that unleash the vast innovation potential installed during the pre-crisis 'installation period' could lead to a new golden age during the 'deployment period' of ICTs, one that, in this case, is 'unavoidably global and necessarily sustainable' (Perez, 2013, p.10). However, this would require many changes in policy; for example, a redesign of the financial architecture, fiscal and monetary policy that supports the 'real' economy, massive investment in education, but also major reform of education systems, and promotion of both R&D and grass root entrepreneurship.<sup>3</sup>

Given these developments, it is time to explore the links between innovation and its many, potentially very complex, wellbeing implications in new ways. It has been argued elsewhere that one must go beyond standard welfare analysis and use a model of the innovation–subjective wellbeing (SWB) nexus (Engelbrecht, 2014a). This does not imply that policy makers should aim to maximise SWB; simply that better and more comprehensive knowledge of the nexus should be of interest to policy makers concerned with living standards, sustainable development and wellbeing. Measurement of SWB impacts of innovation would be a useful additional input into policy making. This should not be completely alien to policy makers, as SWB is already mentioned in the *Framework* as a useful check on what is important to individuals, and such organisations as the OECD now regularly collect and analyse SWB data (OECD, 2011b, 2013).

This paper is organised as follows. After briefly introducing the *Framework*, the paper discusses some major issues associated with the capital approach that question its usefulness, or at least highlight the need for its improvement. Next, the paper focuses on innovation and SWB. First, it introduces the main features of the general model of the innovation–SWB nexus. Secondly, to strengthen the case for exploring the nexus, further evidence on the recent normative turn in innovation economics is discussed. The concluding section of the paper provides some suggestions about how one might integrate and apply a SWB analysis of innovation in policy analysis. It argues that this does not make one a neo-Luddite! Instead, it might help overcome resistance to innovation. Finally, there is an [Appendix](#) that contains a critical examination of the few occasions on which innovation and SWB are mentioned in the *Framework* documents.

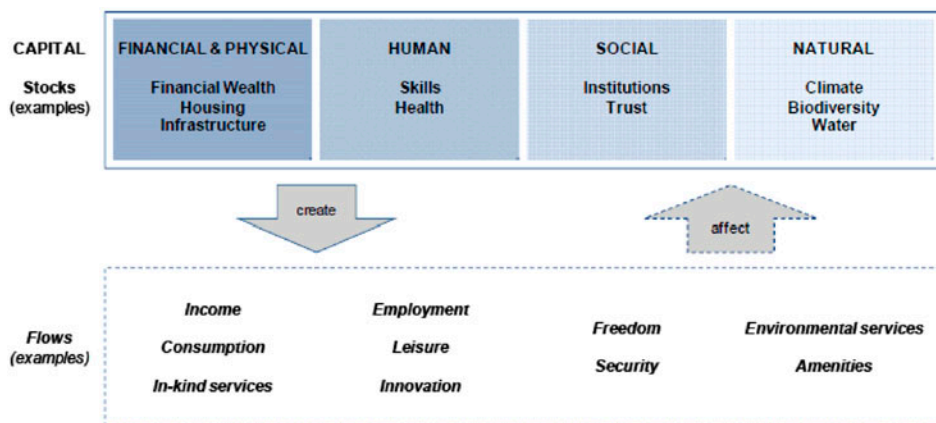
### The Living Standards Framework: a brief overview

Gleisner *et al.* (2011, p.2) summarise the five elements recognised by the *Framework* as follows (bold in the original):

- there is a broad range of **material and non-material determinants** of living standards (beyond income and GDP);
- **freedoms, rights and capabilities** are important for living standards;
- the **distribution of living standards** across different groups in society is an ethical concern for the public, and a political one for governments. It also has efficiency implications, into which empirically-based economic analysis can provide useful insights;
- the **sustainability of living standards** over time is central to ensuring that improvements in living standards are permanent, with dynamic analysis of policy needed to weigh up short- and long-term costs and benefits; and
- measuring living standards directly using self-assessed **subjective measures of wellbeing** provides a useful cross-check of what is important to individuals.

The Treasury has adopted a capital stock and flows approach as the basis for its *Framework* (see Figure 1). The annex to Gleisner *et al.* (2011) presents some stock and flow data for New Zealand and some other OECD countries. When using the *Framework*, the Treasury intends to take into account information on levels, distribution and interaction of capital stocks, as well as their changes over time.

The next step in the Treasury's work on living standards is presented in a 2012 conference paper (Treasury, 2012) and in a revised and extended version of Gleisner *et al.* (2011) (Gleisner *et al.*, 2012). There, the case for, and details of, a practical living standards tool designed to assist policy analysts in their day-to-day work are introduced. Figure 1, depicting the *Framework*, is slightly extended, but innovation is still indicated only as one of the flows associated with human capital (HC).<sup>4</sup> Importantly, five major focus areas for policy are identified that the Treasury believes are important for living standards, central to its own role, and amenable to policy.



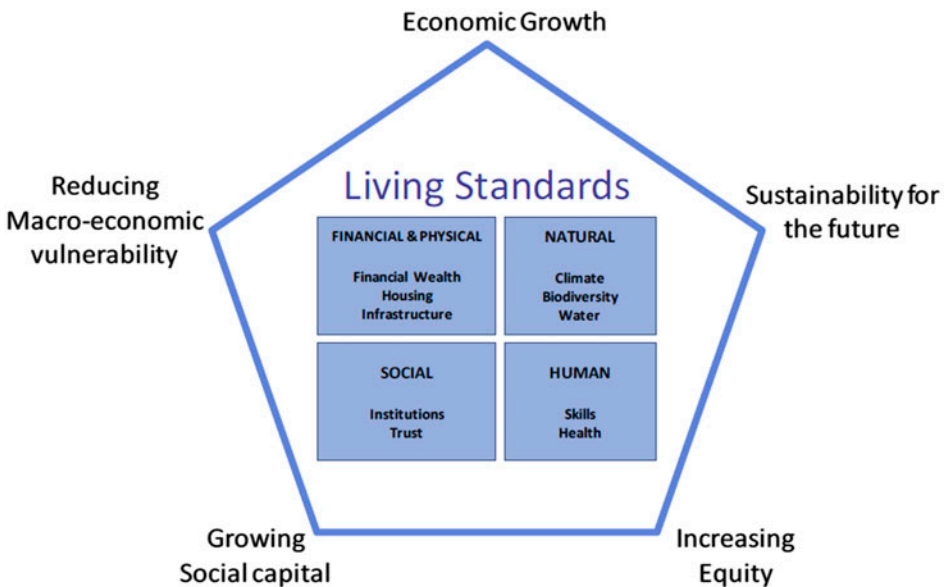
**Figure 1.** The Treasury's *Living Standards Framework*  
Source: Gleisner *et al.* (2011, Figure 1, p.3).

They are economic growth, reducing macroeconomic vulnerability, growing social capital, increasing equity and sustainability for the future. The focus on these five was found necessary because the *Framework* itself is too complex for policy advice. They are acknowledged by the Treasury to be value judgements about what are the important aspects of, and drivers for, improving living standards, and they are to be regularly reviewed. Innovation, arguably the most important driver of living standards, is not explicitly included, despite the fact that basically all policies associated with the five key policy aspects affect innovation (and are affected by it) either directly or indirectly.

The policy tool is shown as a pentagon (see Figure 2).<sup>5</sup> Each corner is associated with one of the five main policy areas. The impacts of policy changes can be indicated on the axes and compared with the *status quo*, or used to assess New Zealand's performance in terms of the five goals over time and/or across country (for examples, see Treasury, 2012; Gleisner *et al.*, 2012). The Treasury has also produced draft analysis guides and some background notes and further reading for each of the five major policy focus areas of the *Framework* (Treasury, 2013a, 2013b, 2013c, 2013d, 2013e). The *Appendix* critically discusses in some detail the few occasions on which SWB and innovation are mentioned in the *Framework* documents.

### Some unresolved issues associated with the capital approach

The capital approach to development interprets development as a process of building wealth by efficiently managing a portfolio of different capital stocks, in particular using natural resource rents to build up other forms of capital (World Bank, 2006). As mentioned in the foreword to World Bank (2011), 'development is, at heart, a process of building wealth – the produced, natural, human, and institutional capital



**Figure 2.** Living standards and the five key policy aspects  
Source: New Zealand Treasury (Treasury, 2012, Figure 6, p.11).

which is the source of income and wellbeing' (Andersen and Canuto, 2011, p.xi). The capital approach is undoubtedly a major contribution to the measurement of the comprehensive or total wealth (TW) of nations and sustainable development, using the neoclassical economics paradigm. However, even disregarding for a moment the issue of the neglect of innovation, measurement of TW and its major sub-categories of natural capital (NC), produced capital (PC) and intangible capital (IC) (the last includes human and institutional capital, among others) is a work in progress. Current estimates depend, by necessity, on numerous theoretical and empirical assumptions that can and have been questioned. Also, many important resources, such as water and fisheries, are left out of the accounts presented by the World Bank (2006, 2011); others, such as ecosystem services, are only partially included. Some of these issues are discussed in Engelbrecht (2009, 2012a, 2014b). The next section raises but a few of the conceptual and empirical issues that should alert policy makers to potential problems that might arise when trying to apply the *Framework*.

### ***How to calculate total wealth?***

World Bank (2006, 2011) use TW per capita (TWpc) as a measure of social welfare<sup>6</sup> and focus on changes in the composition of wealth across countries and over time. TWpc is calculated as the present value of (sustainable) future consumption.<sup>7</sup> NC per capita (NCpc) and PC per capita (PCpc) are estimated directly. IC per capita (ICpc) is then obtained by subtracting the latter two from TWpc (i.e., it is a residual that captures all measurement errors and items that should have been included in NC and PC, in addition to what it is supposed to measure). In World Bank (2006), it also includes net foreign assets. In World Bank (2011), they are excluded from IC and listed separately. The issue of capital gains, and asset bubbles in general, potentially affecting all forms of capital, is not addressed and needs to be explored.

An alternative approach to deriving TW that does not involve its largest part being estimated as a residual is to estimate all major components directly and then add them up. This has been pursued by Dasgupta (2009) and Arrow *et al.* (2012). This circumvents the need to have a good forecast of future consumption which, according to Arrow *et al.* (2012, p.329), 'amounts to assuming that we know how sustainable the economy is, when that is what we are trying to determine'. They introduce a number of other innovations when estimating capital stocks (for example, they allow TFP to differ between countries and they introduce health capital). However, implementation of this alternative approach is currently impossible for most countries.

### ***Schooling capital, health human capital and total factor productivity***

The major forms of capital subsumed under IC are HC, social capital and institutional capital. World Bank (2006, chapter 7) reports that schooling-based HC and institutional capital, the latter captured by an index of the rule of law, account for the majority of the variation in IC across countries. Using data for three years, World Bank (2011, chapter 5) finds that 'health quality adjusted schooling-based HC' is the dominant form of IC in rich countries, and the only statistically significant production factor in high-income OECD countries.<sup>8</sup> World Bank (2011, Table 5.3, p.100) reports ICpc and HCpc estimates for a select number of countries, including the G7 countries. For Canada and Japan, the reported values for HCpc are larger than those



for ICpc (by 18% and 4% respectively). What can explain these estimates? Presumably social and institutional capital are not negative in either country. Problems with some of the assumptions made in deriving the estimates are indicated.

For a number of years, the OECD has been conducting an HC project, the purpose of which is to provide numerical capital stock estimates that can be compared across countries and across time. They are derived from the lifetime income approach, and are regarded as more comprehensive than schooling-based HC. Liu (2011) reports that for a sample of 14 OECD countries, the estimates for HC are substantially larger than those for PC. The ratio of HC to GDP ranges from around eight to over 10. Liu explicitly points out the importance of developing a temporal volume index of HC for measurement of sustainability in the capital approach to development.<sup>9</sup>

Hamilton and Liu (2014) go a step further. For 13 mostly high-income countries, they adjust Liu's (2011) HC estimates and explicitly combine them with the 2005 measures of TW reported in World Bank (2011). This enables them to subtract comparable HC stocks from the IC estimates. In short, they calculate the IC residual, or the 'residual of the residual', given that IC itself is measured as a residual. The new residual is interpreted as the stock equivalent of TFP. They find a mean share of HC in TW of 62%, which is four times the value of PC (and 15 times the value of NC).

It turns out that New Zealand's share of its 'residual of the residual' in TW is only 1%, compared with an average of 18% across countries.<sup>10</sup> This result is obtained for an annual real discount rate of 4.58% for NC and HC, which is the uniform rate used for all countries. Hamilton and Liu (2014) also conduct a sensitivity analysis, using 4% and 5% respectively. In this case, New Zealand's 'residual of the residual' makes up -5.5% and +5.2%, respectively (Annex III, Tables 4 and 5). Can it be that New Zealand's stocks of social and institutional capital, and TFP, are so small? Would a smaller negative stock of net foreign assets really be associated with a smaller IC residual, as simple mathematics would suggest? Hamilton and Liu (2014) cannot explain the IC residual estimate for New Zealand.<sup>11</sup> Hamilton and Hepburn (2014, p.8) acknowledge that the empirical results for New Zealand are 'simply implausible'.

HC also raises major issues in Arrow *et al.*'s (2012) alternative approach to measuring TW. They include a schooling-based HC variable as well as a health capital variable (which is also a type of HC) and find that inclusion of health capital makes a huge difference. It turns out to be twice as large as all the other forms of capital combined, and its growth rate largely determines the growth rate of TW. Arrow *et al.* (2012) acknowledge that there are major unresolved issues about how to measure and interpret health capital in the context of the capital approach and of the measurement of sustainable development that require much more research. Health capital seems to be the ultimate 'anthropocentric turn' in the measurement of TW. If, as seems to be the case, it dwarfs everything else, what does this really imply in terms of economic progress and living standards?<sup>12</sup>

### ***The capital approach, economic sustainability and the Cambridge capital controversies***

Gleisner *et al.* (2011, 2012) correctly acknowledge that consideration of sustainability has led to new approaches to measuring living standards, in particular the capital approach to development. The guide on sustainability for the future (Treasury, 2013b)

states that measurement of capital stocks, flows and sinks are used as key indicators of sustainability.<sup>13</sup> This, of course, presumes that these can be measured and usefully employed in a forward-looking manner to assess economic sustainability. While progress in measurement is being made in many areas, the issues raised in the previous two sections indicate that for capital stock measures, this might be a rather optimistic assumption. However, even if in principle it is accepted that changes in TWpc are an important indicator of whether development is economically sustainable, problems arise when trying to implement these ideas and concepts. Partial indices, such as adjusted net savings, are often used to approximate the conceptually preferred index, ‘changes in TWpc’. Engelbrecht (2014b) has shown that the partial measures are not highly correlated with the latter. Moreover, even different partial measures, although highly positively correlated across OECD countries, can produce divergent results for particular countries. This happens to be the case for New Zealand.

The discussion so far has assumed that the capital approach to development makes sense. While it seems useful in highlighting the changing composition of TW and TWpc over time (i.e., looking backwards), it is not clear that the approach is a useful guide to policy for future developments. By neglecting innovation, it also neglects the many insights about technological change accumulated by non-neoclassical schools of thought (such as evolutionary economics) and innovation studies in general. For example, issues of path dependence and economic complexity do not seem to fit easily within the *Framework*.<sup>14</sup>

Lastly, at a deeper theoretical level, the capital approach to development assumes that the various capital stocks making up TW can be measured independently of their prices. This issue played a major part in the Cambridge controversies in capital theory, which raged from the mid-1950s through to the mid-1970s and which have since been ignored by mainstream economists (Cohen and Harcourt, 2003). With the increased interest in measurement of macro-level capital (wealth) stocks and their important role in the debate about economic sustainability, it seems time to revisit and update this debate.

### **Innovation and subjective wellbeing**

In the capital approach, productivity is treated either as the ‘residual of the residual’, or it is added to the growth rate of TW, using exogenous estimates (as in Arrow *et al.*, 2012). Therefore, it is not surprising that innovation is not explicitly acknowledged and modelled.<sup>15</sup> That, of course, is this paper’s main criticism of the approach. Furthermore, I argue that as a step towards a normative assessment of innovation, its many impacts on SWB should be assessed. The process of creative destruction associated with many instances of innovation depreciates (destroys) not only physical capital, but also human capital, social capital, etc. Therefore, linking capital accumulation and ‘welfare’ is much more complicated than it might seem at first. With the development of SWB research in recent decades, there can be no excuse for not trying to measure these impacts on human wellbeing, as assessed by people themselves.

### ***The general model of the innovation–subjective wellbeing nexus***<sup>16</sup>

Engelbrecht (2007, 2012b) laments the lack of reciprocal acknowledgement in the policy discourses about knowledge-based economies and about SWB, and discusses



their more obvious interfaces, represented by the nexus of education, work, innovation and SWB. While of major importance, they are just part of a much more complex system that connects innovation and SWB. The general model (Engelbrecht, 2014a) builds on an earlier contribution by Swann (2009, chapter 19) that introduces a model of innovation and ‘Ruskinian’ wealth creation. Ruskinian wealth is named after John Ruskin (1819–1900), the British philosopher and art historian, who advocated a broad view of wealth that seems closer to ‘quality of life’, in both an objective and a subjective sense (Ruskin, 2009). However, it is preferable to distinguish clearly between objective and subjective wealth.<sup>17</sup>

The general model consists of elements and links between them, thereby highlighting a multitude of possible direct and indirect links and feedback effects. It emphasises the SWB effects not just of outcomes, but also of processes (means and ends).<sup>18</sup> The systems thinking inherent in the model should not be alien to advocates of the *Framework*, as this also emphasises the crucial importance of interactions among its various components, and the accompanying trade-offs and/or synergies. The elements included in the model are, in broad terms, invention, innovation, workplace, product market, material standard of living, natural environment, ‘objective’ wellbeing and SWB. Selection of particular elements is a question of judgement and, therefore, contestable, just as in the case of the elements highlighted in the *Framework*. Each element can be proxied by a number of alternative and/or complementary variables. Depending on the specific application, one can argue about whether some of the elements should be divided into separate elements (e.g., innovation outputs and inputs, entrepreneurship).

The workplace deserves special mention. At least potentially, it receives, as well as generates, many of the SWB impacts associated with innovation. Work can create a lot of stress and illness in people’s lives (OECD, 2011a). It is also known that a certain level of stress can help people succeed in challenging tasks, creating ‘flow’ experiences (Csikszentmihalyi, 1990). Ng *et al.* (2009) suggest that research should explore how to maximise the benefits of stress without increasing its negative effects. Over the last decade or so, the intimate and diverse relationships between work and SWB have been the subject of many different strands of research.<sup>19</sup>

The elements and links are also affected by many additional factors. One should think of the model as being embedded in a box or frame that captures broad societal factors (‘framework conditions’, such as institutions, values and culture) that influence innovation, SWB, the other elements and links among them.<sup>20</sup> More specifically, in the context of the national (and other) systems of innovation, this includes the intellectual property rights regime and opportunities and incentives for talented individuals. Income distribution effects might be traced through a number of links, but they will also be influenced by framework conditions, such as the extent of the welfare state and support for retraining.<sup>21</sup> In short, additional (national and/or international) factors impacting on the elements and links might need to be added in any empirical application of the model.

The model contains the old linear model of innovation as a special case, with causation going from invention, to innovation, to the workplace and resulting in new products or processes, enabling new, improved and/or cheaper products being sold in the market and thereby increasing material living standards and utility/welfare. Even in cases where this largely discredited model does apply, its SWB implications become less clear and more complex once procedural utility is admitted. It is easy to imagine that the net impact of innovation on SWB might be weakened or even

become negative if procedural utility impacts counteract outcome utility. Swann (2009) strongly suspects that much creativity contributes to wealth creation through different channels than those emphasised in the linear model. He mentions direct links from creativity to the workplace. Companies might allow staff to spend half a day a week to pursue their own blue sky projects, which might, or might not, result in invention and/or innovation. However, if this increases SWB, it is likely to raise work morale and productivity.<sup>22</sup> Moreover, some innovations bypass the workplace and link directly to the product market (those that directly affect the organisation of markets, as when supermarkets and e-business replace smaller shops).

There might also be SWB impacts associated with the process of consumption (consumption externalities might include more garbage, lower amenity values, depleted resources) and status effects (keeping up with the Joneses, the hedonic treadmill). Schwartz (2004) suggests that the process of purchasing final goods and services itself might reduce SWB if an abundance of choice produces anxiety. Swann (2009) points out that the market place can have SWB impacts other than those associated with consumption (for example, people might derive pleasure from browsing). However, some innovations might reduce SWB for some people (such as nuclear energy, genetically modified food, cloning, and the chlorination of drinking water), especially if consumers cannot circumvent adoption. In contrast, von Hippel's (1988, 2005) user innovation by intermediate or final consumers can create another set of links connecting innovation, invention, product market and consumption.<sup>23</sup>

The general model of the innovation–SWB nexus is best thought of as a focusing device to help raise awareness of the complex issues involved, and to help generate hypotheses. In any empirical application, some of the elements and links will be more important than others. An important issue that can only be mentioned here is the question of what time horizon to use when applying the model. In practice, this will depend on data availability. The measurement of SWB impacts will almost certainly be incomplete, falling short of what we would like to measure. This should not be an excuse not to try! Only the accumulation of such (inevitably imperfect) studies will help us accumulate knowledge of the innovation–SWB nexus.

### ***Further evidence on the normative turn in innovation economics***

Some recent additions to the innovation literature also point to the importance of the innovation–SWB nexus. Martin (2013) has reviewed the main contributions of innovation studies over the last few decades and proposes 15 challenges for the coming decades (see Table 1). Most of them (certainly challenges 1–8) can be (more or less) directly related to the general model of the innovation–SWB nexus.

Furthermore, a number of evolutionary economists have recently begun to explore the development of a normative theory of creative destruction, and some of them focus (at least partly) on SWB and procedural utility. Binder (2013), for instance, argues that SWB research has reached a stage where SWB can be used to assess the welfare effects of innovative change. Policy should focus on creating the institutional frameworks that enable individuals to pursue SWB. In another paper, Binder (2014) proposes enhancing the SWB approach by adding features of Sen's (1985) capability approach. This is also explored in a chapter of the 2013 *World Happiness Report* (Hall, 2013), and by Veenhoven (2010). It is a promising idea that needs to be pursued further, including in the context of the innovation–SWB nexus.

**Table 1.** Ben Martin's 15 challenges for innovation studies

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|     |                                                                                                               |
|-----|---------------------------------------------------------------------------------------------------------------|
| 1.  | From visible innovation to 'dark' innovation.                                                                 |
| 2.  | From boys' toys to mundane but liberating innovation.                                                         |
| 3.  | From national and regional to global systems of innovation.                                                   |
| 4.  | From innovation for economic productivity to green innovation.                                                |
| 5.  | From innovation for economic growth to innovation for sustainable development.                                |
| 6.  | From risky innovation to socially responsible innovation.                                                     |
| 7.  | From innovation for wealth creation to innovation for wellbeing (or from more is better to enough is enough). |
| 8.  | From winner take all to fairness for all?                                                                     |
| 9.  | From government as fixer of failures to the entrepreneurial state.                                            |
| 10. | From faith-based policy (and policy-based evidence) to evidence-based policy?                                 |
| 11. | Pricking academic bubbles.                                                                                    |
| 12. | Avoiding disciplinary sclerosis.                                                                              |
| 13. | Identifying the causes of the current economic crisis.                                                        |
| 14. | Helping to generate a new paradigm for economics – from Ptolemaic economics to ???                            |
| 15. | Maintaining our research integrity, sense of morality and collegiality.                                       |

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Source: Adapted from Martin (2013, Table 8.2, p.182).

Similarly, Schubert (2012a, 2012b, 2013) argues for an evolutionary (Schumpeterian) theory of wellbeing that incorporates aspects of SWB and procedural utility, but goes beyond them. He suggests using 'effective preference learning' (a person's motivation and ability to learn new preferences in all domains of life) as a wellbeing measure. Innovation should be promoted as long as it contributes to such learning. His views on policy are, in many respects, as hands-off as Binder's. They focus on designing an institutional framework that enables procedural sources of SWB and, in addition, the anticipation of hedonically valuable outcomes (Schubert, 2012b). The latter requires a certain degree of novelty (uncertainty). In another contribution, Schubert (2013) tries to strengthen his case for using effective preference learning as a wellbeing measure, but in attempting to reconstruct Schumpeter's (explicit and implicit) reasoning on welfare, he distances himself from SWB measures, seemingly back-tracking from some of his earlier views. His dismissal of SWB seems too hasty, given the development of SWB research over recent decades.<sup>24</sup> Moreover, if private agents can learn what promotes SWB, so should government, given its role in the economy and in society in general. This might suggest use of discretionary policies that aim at supporting, but not maximising, SWB.

While conceptual and other theoretical efforts to develop a normative theory of innovation are continuing, empirical studies that explicitly link innovation and SWB are also beginning to emerge in innovation-related journals (outside the well-established psychological literature). Dolan and Metcalfe (2012) find a strong link between innovation (proxied alternatively by being original and having imagination) and SWB (in the workplace and in life generally). They acknowledge the need for more research to determine causation and for new datasets to examine the innovation–SWB nexus. Commenting on the implications of their findings, they argue that:

In fact, these relationships have potentially important implications for productivity and economic growth. For instance, a 33% increase in life satisfaction is associated with 8% higher imagination. If this relationship from SWB to creativity is causal, then changing people's SWB could be a very effective way of increasing productivity and economic growth. In the aggregation of individuals, SWB could be a vital missing piece in the debates and research in innovation and economic growth. (Dolan and Metcalfe, 2012, p.1497)

The explanatory variables used in Dolan and Metcalfe (2012) capture mostly personal attributes, some of which can be mapped into the model of the innovation–SWB nexus, but many potentially important factors are not included. Further empirical studies are needed to build up our knowledge of the innovation–SWB nexus.

### Concluding comments

The purpose of this paper is to stimulate discussion about the *Living Standards Framework* used by the New Zealand Treasury as a supplementary input into policy making. The *Framework* is firmly based on neoclassical economics and has important conceptual and empirical limitations. Of major concern is the neglect of innovation and its diverse wellbeing implications. Arguably, the latter can and should be assessed not only in terms of ‘objective’ wellbeing, but also in terms of SWB. Further research should explore how the model of the innovation–SWB nexus could either be incorporated into the *Framework*, or used alongside it as an additional input into the policy development and evaluation process.

It might be instructive to explore a particular policy using (a) the current *Framework*, and (b) the *Framework* in conjunction with the model of the innovation–SWB nexus, in order to determine whether this is likely to produce very different results. A pragmatic approach will be required when implementing the nexus model. Analysts should determine the most important variables and links, and also indicate what should but cannot be measured. If a specific link turns out to be especially important (perhaps strongly negative), policy might be able to target it. In this way, the model of the innovation–SWB nexus can be used to identify discretionary policy interventions aimed at supporting SWB without trying to maximise it.

However, many policy makers and analysts seem to dislike considering the innovation–SWB nexus. Views that the only progress that counts is that which is measured by economic growth, and that innovation is always and everywhere a good thing, are still widespread. Undoubtedly, there is great potential for misunderstanding. Atkinson and Ezell (2012), for instance, give the impression that exploration of the innovation–SWB nexus is synonymous with being neo-Luddite. Consider the following:

A wide array of groups and individuals ideologically oppose innovation. For example, neo-Luddites ... view innovation not as a force for progress to be encouraged, but as something to be stopped. They want a world in which a worker never loses a job; consumer rights trump all else, even lower prices; no personal information is shared, even if sharing benefits society and enables a vibrant Internet ecosystem; the environment is protected whatever the costs; and cities are designed for residents who live in apartments and travel by transit to patronize small, local merchants. In short, they want a world in which risk is close to zero, losers from innovation are few, and change is glacial and managed. (Atkinson and Ezell, 2012, pp.279–80)

Such caricatures of anti-innovation views have to be taken seriously, not least because they indicate the strength of feelings and views that make difficult any rational and considered discussion of SWB impacts on innovation.

Exploration of the innovation–SWB nexus does not (necessarily) contradict the three key principles of innovation economics as stated in Atkinson and Ezell (2012, pp.296–97): (a) that the central focus of economics should be on growth instead of business cycles and allocative efficiency; (b) that innovation drives growth; and (c)

that market processes need to be supplemented with strong public innovation policies. Arguably, incorporating instead of ignoring insights from SWB research should strengthen, rather than weaken, innovation policies and their impacts. Of course, getting innovation policy right is not easy. Atkinson and Ezell (2012 pp.301–2) suggest it ‘depends on finding the right balance between three key sets of potentially competing factors: (1) individual versus collective interests, (2) current versus future generation interests, and (3) stability versus dynamism’. A *Framework* that has innovation at its core and that also takes account of the innovation–SWB nexus should be useful for exploring and improving the trade-offs.

The presumption is not that the innovation–SWB nexus needs to be explored because innovation is assumed to have negative impacts on SWB and therefore needs to be reduced in some way. Rather, innovation needs to have a central place so that any negative SWB impacts can be addressed by policy. This would help overcome powerful interests in society that might otherwise resist innovation. Arguing in favour of exploring the nexus should not be interpreted as being neo-Luddite, although entrenched ‘innovation is always good’ advocates might claim this. It should simply be seen as a contribution to the development of better evidence-based policy at a time when SWB research has come of age, innovation studies are taken a normative turn, and innovation policy arguably has to be reassessed to counter innovation mercantilism.

### Disclosure statement

No potential conflict of interest was reported by the author.

### Acknowledgement

The author thanks three referees for useful comments that have improved the paper.

### Notes

1. Schumpeter (1947, p.155, fn.12) states that ‘... the question of appraisal of social gains from entrepreneurship, absolute and relative to the entrepreneurial shares in them, and of the social costs involved in a system that relies on business interests to carry out its innovations, is so complex and perhaps even hopeless that I beg to excuse myself from entering into it’.
2. Baumol (2010) extends neoclassical welfare economics to capture the impacts of innovation (‘innovative entrepreneurship’) and emphasises the enormous beneficial spillovers and other externalities from innovation that accrue to people not directly associated with innovation. This implies that, contrary to the standard view, zero spillovers are incompatible with optimality.
3. Perez (2013) further argues that environmental constraints, while undoubtedly the greatest challenge, might also be the greatest opportunity for massive green innovation and changes towards sustainable lifestyles that usher in a new golden age.
4. SWB is now explicitly included (as a row across the bottom of the figure), as is the distribution within the population and over time (added across the right-hand side of the figure). Otherwise Figure 1 is unchanged.
5. Also see the slightly different version in Gleisner *et al.* (2012, Figure 12, p.230).
6. Strictly speaking, this is only correct if some restrictive assumptions are satisfied; for example, constant returns to scale in production, constant population growth and per capita consumption being independent of population size (World Bank, 2006).
7. This is a key assumption made in most of mainstream macroeconomics and growth theory. It has hardly ever been tested empirically. Only recently have researchers begun

- to use long-term historical data to test, and seemingly confirm, the assumption for Great Britain and the United States (Greasley *et al.*, 2014a, 2014b).
8. That is, HC per worker calculated as a function of years of schooling is adjusted using adult survival rates that proxy for health status (World Bank, 2011, p.97).
  9. Liu finds that although HC stocks have increased over time, HCpc has declined in some countries (Israel, Korea, Norway and the US) because of population aging outweighing increases in education levels. It has remained broadly stable in Australia, Canada, France and New Zealand.
  10. Because of data problems, Hamilton and Liu (2014) exclude Korea as an outlier when calculating the average share of the IC residual across countries.
  11. They comment that ‘There are no obvious explanations for this low share ... New Zealand stands out ... as having the highest share of human capital after Korea, in spite of a projected real income growth of only 0.77 per cent ... The other notable feature for New Zealand is the large negative figure for net foreign assets, more than 5% of total wealth’ (Hamilton and Liu, 2014, p.84).
  12. Some of Arrow *et al.*’s (2012) results might be attributable to their use of schooling-based HC instead of a more comprehensive HC measure. On this and other criticisms of Arrow *et al.*’s approach, see Hamilton (2012).
  13. It is also being implemented by Statistics New Zealand as one of its main approaches to measuring sustainable development. See Statistics New Zealand’s website on sustainable development, available from <http://www.stats.govt.nz/sustainabledevelopment> [accessed May 2013].
  14. On path dependency, see Arthur (1994). For a recent survey of complexity economics, see Antonelli (2011) and the contributions to this volume.
  15. Note that the World Bank has no entry for innovation in its indices. World Bank (2011) has one reference to technical progress – in the context of decomposing IC (p.99) – which is proxied by a time dummy.
  16. Parts of this section are based on Engelbrecht (2014a). See this paper for further references.
  17. The differences between the models used by Swann and Engelbrecht are discussed more extensively in Engelbrecht (2013), which argues for a ‘unified well-being theory of innovation’ and notes its relevance for the normative assessment of social innovations. There seems to be a much clearer recognition of the important links between, on the one hand, SWB, and, on the other hand, social innovation and social and welfare policies, than of the links between SWB and technological innovation (see Newton, 2007; O’Donnell, 2013, pp.102–3). Deeming (2013) argues that measurement and analysis of SWB is central to the development of social policy.
  18. The wellbeing effects of processes are captured in economics by the concept of ‘procedural utility’ (Frey *et al.*, 2004), whereas outcome utility is associated with mainstream economic theory. Empirical evidence of the importance of procedural utility has been accumulating (see Frey and Stutzer, 2005; Block and Koellinger, 2009; Schneck, 2014).
  19. See Helliwell and Huang (2011) and Dewe and Cooper (2012). Research on workplace SWB and productivity is also multifaceted and has a long history. For a survey, see Zelenski *et al.* (2008); they find that despite there being many inconsistent findings, overall there seems to be a positive relationship between the two.
  20. See Helliwell (2012) on the importance of the social context for SWB, and the implications for the management of public and private institutions.
  21. Income inequality seems to have a complex relationship with SWB. However, much of the conflicting empirical evidence might be attributable to estimation issues (Verme, 2011).
  22. This is well established in the psychological literature (Isen *et al.*, 1987).
  23. Many other possible direct and indirect links among elements of the general model of the innovation–SWB nexus are discussed in Engelbrecht (2014a).
  24. Potts (2011) is another evolutionary economist who advocates a hands-off approach when it comes to happiness policies. He focuses on happiness-signalling effects, which imply that economic agents learn from each other about what creates happiness, much like the price-signalling effects emphasised by Hayek.



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## Appendix. Innovation and subjective wellbeing in the *Framework* documents

Gleisner *et al.* (2011, p.28) state that 'Treasury's *Framework* is supplemented by insights from the subjective wellbeing literature ... subjective measures of wellbeing have been used ... primarily as a useful cross-check to ensure that the objective measures are the right ones'. This refers mainly to an acknowledgement of the links among SWB and health, employment and social capital, as well as how people feel about distributional issues. This is further elaborated in subsequent publications.

Treasury (2012, Figure 5, p.9) lists the key determinants of SWB as highlighted in the first *World Happiness Report* (Helliwell *et al.*, 2012). Although this report is meant to provide a summary of the state of the art of SWB research, a word search reveals that 'innovation' and 'invention' are not mentioned. 'Technological progress' is mentioned once, in the introduction by Sachs (2012, p.3):

... the world's economic superpower, the United States, has achieved striking economic and technological progress over the past half century without gains in the self-reported happiness of the citizenry. Instead, uncertainties and anxieties are high, social and economic inequalities have widened considerably, social trust is in decline, and confidence in government is at an all-time low. Perhaps for these reasons, life satisfaction has remained nearly constant during decades of rising Gross National Product (GNP) per capita.

While these issues are important, they are only part of the much larger innovation–SWB nexus. There is only one hint in the rest of the *World Happiness Report* of some potential connection between innovation and the *Framework* – 'technology' is mentioned in the context of social inclusion, which is the suggested third pillar of the Sustainable Development Goals to be developed after the Rio+20 Conference:

The third pillar should be **social inclusion**, the commitment of every society that the benefits of technology, economic progress, and good governance should be accessible to everybody ... Happiness must not be the preserve of a dominant group. The goal should be happiness for all (emphasis in original). (Sachs, 2012, p.8)

In short, while some links among technology, equity and SWB are mentioned, they are not explored in much depth; the innovation–SWB nexus is largely neglected in the *World Happiness Report*.<sup>25</sup> Therefore, it is not surprising that this is also the case in the current version of the *Framework*. However, some links that are important in my model of the nexus are already acknowledged, either directly or indirectly, in the Treasury's publications explaining the *Framework* and its use. It is worth pointing them out in detail.

The link between paid employment and SWB is explicitly mentioned in Gleisner *et al.* (2011) and Treasury (2013c). Both potentially positive and negative effects are acknowledged. So are SWB effects of unpaid employment. Also directly acknowledged are links between SWB and some of the major functions provided by public institutions, such as rights, freedoms and security (Gleisner *et al.*, 2011, p.25). The link between NC and SWB is acknowledged indirectly, via the amenity value of NC (p.26). Treasury (2012) hints at, or

explicitly mentions, a number of links between elements of the *Framework* and SWB: the quality of the environment and mental wellbeing (p.10); the controversy about economic growth and SWB (p.12); the strong correlation between social capital and SWB (p.15); the finding that perceptions of unfairness reduce SWB (p.16).

Turning to the acknowledgement of innovation in the *Framework* documents, Gleisner *et al.* (2011, p.23) devote a whole paragraph to its importance as a major determinant of economic growth. This is in the context of discussing HC. When it comes to the illustrative attempt to measure New Zealand's progress using Figure 2, innovation and innovation-related indices again are not mentioned, and neither is SWB (see Treasury, 2012, Figure 8, p.21). However, innovation is mentioned in the context of discussing beneficial effects of social capital (p.15).

Treasury's (2013a) 'short guide to economic growth' does mention innovation, but only as one of many factors related to the *Framework*. It is not given a central role. This despite the fact that 'New Zealand's average GDP per capita growth for the last six decades has been poorer than all other OECD countries' (p.4). The 'short guide to sustainability for the future' (Treasury, 2013b) does not discuss how capital stocks, flows and sinks are related to innovation. This seems increasingly inappropriate, given the emphasis on 'green innovation' and 'green growth'. Treasury's (2013c) 'short guide to increasing equity' again does not mention innovation, but it does mention 'technological progress' (on p.16) in the context of summarising international research findings that show that ICTs in particular affect different income groups differently. The 'short guide to social infrastructure' acknowledges that links between social infrastructure or social capital and economic growth are complex (Treasury, 2013d).

The 'short guide to managing risks' (Treasury, 2013e) is probably the most disappointing of all the guides. It should have been extended to cover not only risk but also (Knightian) uncertainty (Knight, 1921). Although uncertainty is mentioned at least twice, it is not highlighted or elaborated, i.e. it seems more like an afterthought and a nuisance one has to contend with in 'risk management'. Innovation is only mentioned once, and then with a negative connotation: 'The amount of risk an organisation is prepared to accept, tolerate, or be exposed to at any point in time ... allows for an appropriate balance between uncontrolled innovation and excessive caution' (Treasury, 2013e, p.4). A low level of innovation or a badly functioning innovation system is not identified as one of the risks [despite the mention of innovation in association with HC in Gleisner *et al.* (2011, Figure 1)]. It is no accident that both innovation and Knightian uncertainty are almost entirely absent from the *Framework*, as they are fundamentally related. To summarise, although there are hints in the *Framework* documents about the importance of innovation for living standards, innovation is not well integrated into it. If there is an 'elephant in the room' with regard to the *Framework*, it surely is innovation.